

Observations of an H-profile in lead hairs of shrews (Mammalia, Soricidae)

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The hairs of shrews consist of three or four different types. After BIEBER and EICK (1974) they are classified as 1. lead hairs which are straight and have no bend, 2. awl and auchene hairs both which have several bends and terminate into an elucidating zone, and 3. zigzag hairs which have several bends but no elucidating zone (fig. 1). As was shown by VOGEL and KÖPCHEN (1978) an H-profile occurs on hairs of shrews of the subfamily Soricinae. This H-profile, which according to VOGEL and KÖPCHEN, is confined to the elucidating zone of the awl and auchene hairs is completely lacking in the subfamily Crocidurinae. The statement that the H-profile only occurs in awl and auchene hairs was repeated by HUTTERER and HÜRTER (1981).

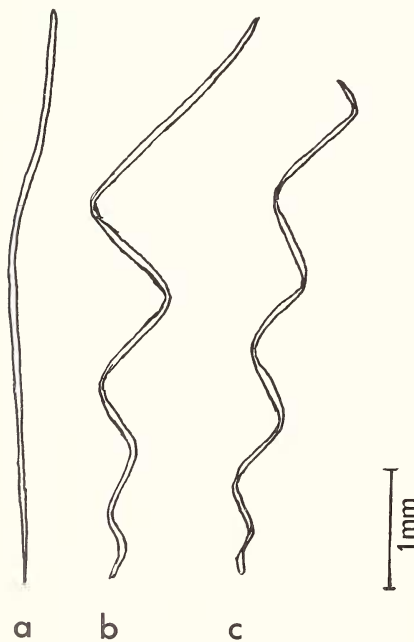


Fig. 1. Different hair-types of *Sorex araneus*
a = lead hair, b = awl hair, c = zigzag hair

In this study hairs of all three main types (no distinction was made between awl and auchene hairs) from *Sorex araneus* (Linné, 1758), *S. coronatus* (Millet, 1828), *S. minutus* (Linné, 1766), *S. minutissimus* (Zimmermann, 1780), *S. caecutiens* (Laxmann, 1788), *S. sinalis* (Thomas, 1912), *S. alpinus* (Schinz, 1837), *Neomys fodiens* (Pennant, 1771), *Crocidura russula* (Hermann, 1780), *C. suaveolens* (Pallas, 1811) and *C. leucodon* (Hermann, 1780) were studied both by scanning and light microscopy. The hairs were taken from the rump of the animals, with a pair of tweezers.

It was found that an H-profile also occurs in lead hairs. This was seen both in the scanning microscope where the H-profile can be seen directly (fig. 2), and in the light microscope where the presence of an H-profile is indicated by the occurrence of ridges situated in the groove which makes up part of the H (fig. 3). The H-zone is confined to the terminal part of the lead hairs, approximately corresponding to the elucidating zone of the awl and auchene hairs. It was found in all species of *Sorex* and *Neomys*, except *S. sinalis* where only two lead hairs were studied. It was absent in all species of *Crocidura*. The H-profile was found

in all kinds of pelage e.g. first summer pelage, winter pelage and second summer pelage (Table 1). Under the light microscope, an H-profile was indicated in 17 of 60 studied soricine lead hairs. The fact that the hairs readily break off if carelessly handled might lead to incorrect identification of elucidating zones of awl hairs as lead hairs. There was,

however, no overlap in length of lead hairs and the elucidating zones of auchene hairs in any of the different pelages (Table 2). Also it was found that a difference occurs in the pigmentation in the terminal end of the hairs, lead hairs generally being less pigmented and appearing more whitish at the tip compared with awl and auchene hairs. That the H-profile occurs only in a minority of all lead hairs raises the question whether lead and awl-auchene hairs really are sharp-limited groups. In view of these observations it seems probable that intermediate hairs with characters of more than one group occur. Several awl and auchene hairs were found to have very short elucidating zones, thus approaching the zigzag hairs in morphology. The lead hairs with an H-profile did, however, apart from the presence of this profile, look exactly like ordinary lead hairs, no other intermediate characters were found.

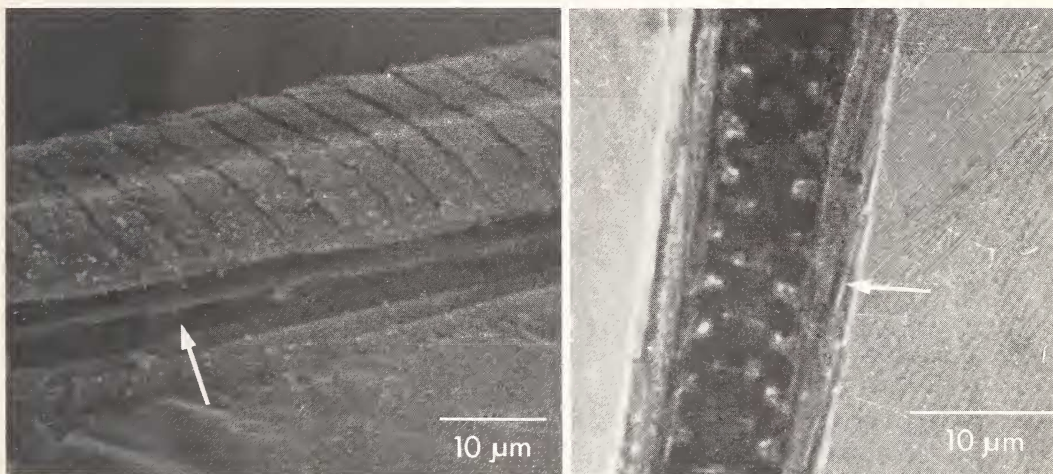


Fig. 2 (left). Lead hair of *Sorex alpinus* in the scanning microscope, showing the H-profile (arrow). – Fig. 3 (right). Lead hair of *Sorex minutus* in the light microscope, showing ridges (arrow) indicating an H-profile

Table 1

Occurrence of the H-profile in lead hairs of soricine shrews

Species	Juvenile pelage lead hairs		Winter pelage lead hairs		Adult pelage lead hairs	
	total	H-profile	total	H-profile	total	H-profile
<i>Sorex araneus</i>	8	2	2	1	1	–
<i>S. coronatus</i>	4	1	–	–	–	–
<i>S. caecutiens</i>	5	–	–	–	3	1
<i>S. sinalis</i>	2	–	–	–	–	–
<i>S. minutus</i>	3	1	7	4	8	3
<i>S. minutissimus</i>	–	–	1	–	1	1
<i>S. alpinus</i>	3	1	–	–	6	1
<i>Neomys fodiens</i>	–	–	3	–	3	1

Table 2

Length (in mm) of different types of hairs in different species of shrews

Species	A	B	C	D	E	F
<i>Sorex araneus</i>	7	11	4.8– 9.7	19	4.0–8.2	1.3–3.6
<i>S. coronatus</i>	2	4	5.5– 6.3	18	4.8–5.4	0.9–2.7
<i>S. caecutiens</i>	6	8	4.1– 4.8	27	2.7–6.1	1.1–2.7
<i>S. sinalis</i>	1	2	6.3– 7.5	11	4.8–6.4	1.1–2.7
<i>S. minutus</i>	8	18	3.9– 6.5	47	3.4–5.5	1.1–2.5
<i>S. minutissimus</i>	2	2	4.2– 4.4	23	2.7–3.8	0.9–2.0
<i>S. alpinus</i>	6	9	5.1– 7.3	63	3.6–6.9	1.1–3.1
<i>Neomys fodiens</i>	6	6	6.6–10.1	40	5.3–8.6	1.5–3.4
<i>Crocidura russula</i>	6	7	5.0– 6.8	16	3.2–5.9	1.0–2.8
<i>C. suaveolens</i>	2	6	3.7– 6.3	22	2.8–3.4	1.1–2.5
<i>C. leucodon</i>	1	2	4.7– 5.0	–	–	–

A = numbers of animals studied; B = numbers of lead hairs studied; C = length of lead hairs (extreme values); D = numbers of auchene hairs studied; E = length of auchene hairs (extreme values); F = length of elucidating zones of auchene hairs (extreme values)

References

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BUCHBESPRECHUNGEN

GRIFFIN, D. R.: **Wie Tiere denken.** Ein Vorstoß ins Bewußtsein der Tiere. Aus dem Amerikanischen übersetzt von ELISABETH M. WALTHER. München, Wien, Zürich: BLV Verlagsgesellschaft 1985. 240 S. DM 36,-. ISBN 3-405-13060-3

Das rasche Erscheinen einer deutschen Übersetzung des Buches von D. R. GRIFFIN, dessen Original 1984 von der Harvard Univ. Press publiziert wurde, muß dankbar begrüßt werden, denn es behandelt wissenschaftlich fundiert und kritisch ein Thema, das einen großen Leserkreis ansprechen dürfte, nämlich die Frage, wie erkennen und verstehen Tiere ihre Umwelt, ist ihr Verhalten ausschließlich instinktbedingt oder gibt es, wenn auch einfach, Bewußtseinsvorgänge und Denkprozesse, die tierisches Handeln steuern können. Es gibt zwar zu diesen Fragen ein umfangreiches Schrifttum, doch ist die Diskussion weithin kontrovers. Der Autor, Erforscher der Echo-Ortung bei Fledermäusen, ist ein anerkannter und kenntnisreicher Verhaltensforscher und Physiologe. Es ist sein besonderes Verdienst, daß er in ausgewogener Weise ein umfassendes Material an teilweise bekannten Fakten und neuen Befunden vorlegt und unter einheitlichen Gesichtspunkten ordnet. Der Rahmen ist weit gespannt und umfaßt gleichermaßen Aussagen der Verhaltensforschung, der Ökologie und der Physiologie. Freilandbeobachtungen finden in gleicher Weise Beachtung wie Ergebnisse der Experimentalforschung. Beispiele werden aus allen Tierstämmen gewählt. Dabei stehen Insekten, Vögel und Säugetiere im Vordergrund.